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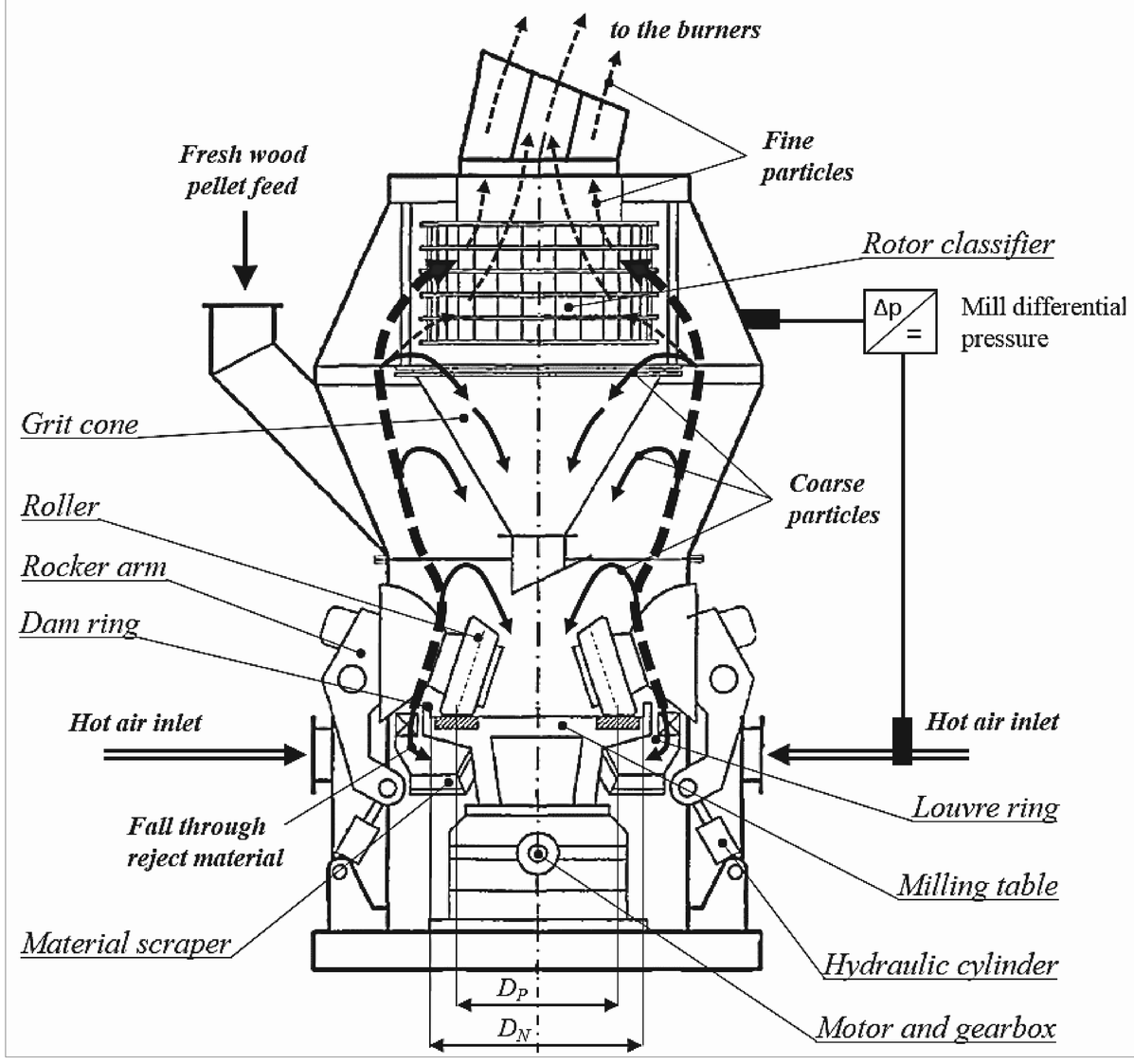
What were our motivation and research objectives?

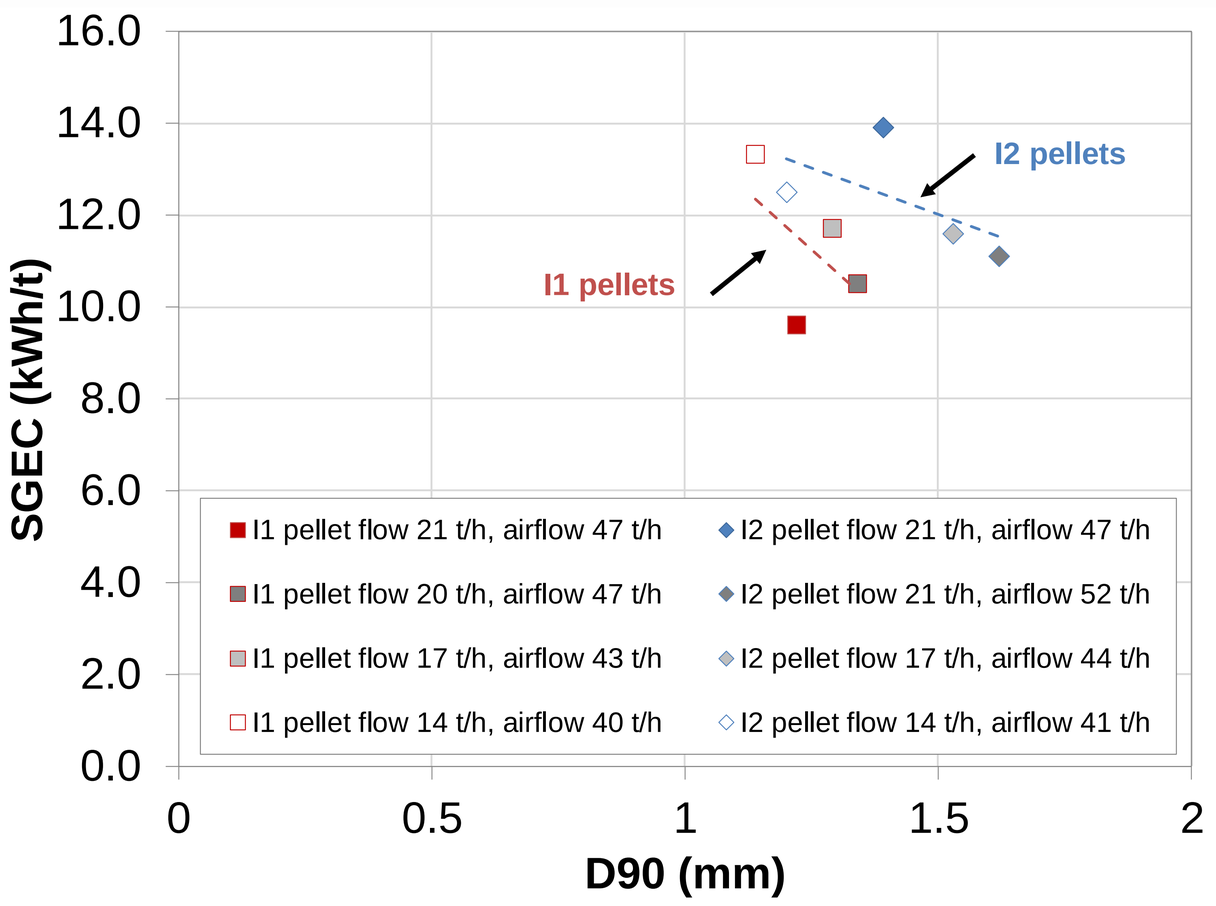
- There are limited experimental data on 100% wood pellet comminution in full-scale coal vertical roller mills.
- To study if the grindability in roller mills and particle separation in dynamic classifiers were affected by the particle size distribution (PSD) of material within pellets.
- Understanding pellet quality properties that affect the milling performance will ensure efficient pellet milling and hence optimize the combustion process.

How was the milling performance assessed?

1) Grinding ***I1 pellets*** (comprise finer particles) and ***I2 pellets*** (comprise coarser particles) in roller mills
2) Mill data collection
   - *Specific grinding energy consumption, SGEC* (kWh/t)
   - *Mill pressure drop,* Δp (kPa)
3) Isokinetic extraction of fine particles from burner pipes
   - *Size/shape analysis using a dynamic image analyzer*



Main findings



Conclusions

- The PSD of material within pellets affects the full-scale milling behavior and particle classification (i.e., cut size).
- I1 pellets yielded a smaller classifier cut size, required less grinding energy, and a lower mill pressure drop.
- The original elongated wood particle shape was not altered by vertical roller mills.
- Operating the mills at higher loads had unfavorable effects on mill pressure drop and classifier cut size. However, SGEC was reduced at higher loads.